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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,647	01/22/2002	Ravi Prasad	10015567-1	9854

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EXAMINER

NECKEL, ALEXA DOROSHENK

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 09/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/056,647	<b>Applicant(s)</b> PRASAD ET AL.	
	<b>Examiner</b> Alexa D. Neckel	<b>Art Unit</b> 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31, 33-35 and 53-62 is/are pending in the application.
- 4a) Of the above claim(s) 10, 11, 16 and 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-15, 18-23, 25-31, 33-35, 53-56, 58--62 is/are rejected.
- 7) ☒ Claim(s) 24 and 57 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 25, 2006 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 33 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 33 recites the limitation "the second reactant" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 22, 23, 25-31, 33-35, 55, 56, and 58-62 are rejected under 35

U.S.C. 102(e) as being anticipated by Muradov (6,653,005).

With respect to claims 22, 23, and 28, Muradov discloses an apparatus comprising:

a reaction chamber (10) including a catalyst (13), an inlet for fuel (16); a gas outlet (17); means (15) for letting liquid out of the reaction chamber (10) not connected to the fuel source and a substantially gas permeable/liquid impermeable hydrophobic membrane structure (14) separating the inlet (16) from the gas outlet (17) (see figure 1).

While Muradov does not explicitly illustrate or disclose a fuel "reservoir" some form of tank, canister, or other fuel holding device would be inherent in the system in order to provide fuel to the fuel inlet (16).

With regard to claim 25, though no "reservoir" is explicitly illustrated or disclosed in connection with outlet (15), having some form of tank, canister, or other holding device would be inherent in the system in order to collect feed exiting outlet (15).

With respect to claim 26, Muradov further discloses wherein the reaction chamber has external housing (10) and the gas permeable/liquid impermeable structure (14) is an enclosed structure (see figure 1), an inlet (16) to the fuel, and a liquid outlet (15).

With respect to claim 27, Muradov further illustrates in figure 1 wherein the gas outlet (17) is in communication with the space formed between the housing (10) and the gas permeable/liquid impermeable structure (14).

With respect to claims 29 and 30, Muradov further discloses wherein the catalyst can be a plurality of porous elements coated with catalyst material, and that the catalyst can be a transition metal (col. 7, lines 48-56).

With respect to claims 31 and 35, Muradov discloses an apparatus (figure 1) comprising:

- an external housing (10) defining a first reactant inlet (16), a liquid outlet (15) and a gas outlet (17);

- an internal housing (14) that separates the first inlet (16) and liquid outlet (15) from the gas outlet (17), is formed from a substantially gas permeable/liquid impermeable hydrophobic membrane structure (14) and includes an inlet (the bottom) operably connected to the external housing inlet (16) and a liquid outlet (the top) operably connect to the external housing liquid outlet (15).

With respect to claim 33, no further structural limitations are recited, therefor the claim continues to read on the device of Muradov as applied to claim 31 above.

With respect to claim 34, Muradov further illustrates in figure 1 wherein the gas outlet (17) is in communication with the space formed between the housing (10) and the gas permeable/liquid impermeable structure (14).

With respect to claims 55, 56, and 60, Muradov discloses an apparatus (figure 1) comprising:

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a reaction chamber (10) including an inlet for fuel (16) and a gas outlet (17);  
while Muradov does not explicitly illustrate or disclose a fuel "reservoir" some form of tank, canister, or other fuel holding device would be inherent in the system in order to provide fuel to the fuel inlet (16); and

an enclosed substantially gas permeable/liquid impermeable hydrophobic membrane structure (14) with its interior connected to the fuel inlet (16) and wherein the gas outlet (17) is in communication with the space formed between the housing (10) and the gas permeable/liquid impermeable structure (14); and

catalyst (13) located within the enclosure formed by membrane (14).

With regard to claims 58 and 59, though no "reservoir" is explicitly illustrated or disclosed in connection with outlet (15), having some form of tank, canister, or other holding device would be inherent in the system in order to collect feed exiting outlet (15). As applied, the inherent reservoirs would be separate structural elements.

With respect to claims 61 and 62, Muradov further discloses wherein the catalyst can be a plurality of porous elements coated with catalyst material, and that the catalyst can be a transition metal (col. 7, lines 48-56).

### ***Claim Rejections - 35 USC § 103***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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8. Claims 1-9, 12-15, 18-21, 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hockaday et al. (2001/0045364) in view of Matkovich et al. (5,070,899).

Hockaday et al., in Fig. 9, discloses a fuel reservoir (7, 39), a reaction chamber (122), an open region (111) defined as a tubular member, and a flow resisting structure within the open region (110, 112), wherein the fuel containing substance within the fuel reservoir comprises sodium borohydride (abstract), wherein the reaction chamber comprises an inlet operably connected to the fuel reservoir and a gas outlet (Fig. 9). The cartridge further comprising a byproduct reservoir (7, 39) including a liquid inlet (Fig. 9) and a substantially gas permeable/liquid impermeable structure (106) separating the reaction chamber liquid outlet from the reaction chamber gas outlet. Wherein the structure creates capillary forces that resist fluid flow. The reaction chamber further comprising catalyst (Fig. 9).

Hockaday et al., in Fig. 3, further discloses a fuel reservoir (7, 39), a reaction chamber (Fig. 3) including a catalyst, wherein the fuel containing substance within the fuel reservoir comprises sodium borohydride (abstract), wherein the reaction chamber comprises an inlet operably connected to the fuel reservoir and a gas outlet (Fig. 3). The cartridge further comprising a byproduct reservoir (7, 39) including a liquid inlet operably connected to a liquid outlet of the reaction chamber (Fig. 3). The reaction chamber comprises an external housing (38) and a substantially gas permeable/liquid impermeable structure (31-32) forming a structure in which catalyst is at least partially located, wherein a space (36) is defined between the inner surface of the reaction

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chamber external housing and the outer surface of the enclosed substantially gas permeable/liquid impermeable structure the is in communication with the reaction chamber gas outlet (37).

Hockaday et al. fails to disclose where the flow resisting structure within the open region (110, 112) is a passive and porous structure, but rather discloses a valve.

Matkovich et al. teaches a valve which permits flow in one direction and prevents flow in the opposite direction, thus eliminating backflow (col. 1, lines 8-11 and lines 39-40) via first and second porous (as well as static or passive) elements (col. 1, lines 60-64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the check valve of Matkovich et al. in the passage along with the general valve in (110) of Hockaday et al. with in order to prevent backflow and yet still allow the desired fluid to flow to the reaction chamber.

With regard to the recitation of a second reactant in claims 31-35, it is noted that the material worked upon does not limit an apparatus claim. MPEP 2115.

#### ***Allowable Subject Matter***

9. Claims 24 and 57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: The prior art neither teaches nor suggests the device as claimed wherein the fuel reservoir contains a fuel containing substance of sodium borohydride.

***Response to Arguments***

11. Applicant's arguments with respect to claims 1-31, 33-35 and 53-62 have been considered but are moot in view of the new ground(s) of rejection.

Arguments Concerning Claims 1-9 and 53; 12-15 and 54; 18-21

Applicant argues that replacing the valve (110) of Hockaday with the check valve of Matkovich would render Hockaday inoperable since the check valve only controls flow in a single direction.

The examiner agrees and has amended her rejection as presented above where the check valve of Matkovich is incorporated into Hockaday in addition to valve (110) of Hockaday, not in place of the valve.

Arguments Concerning Claims 22-30; 31 and 33-35; 55-62

The examiner agrees with applicant's arguments and new grounds of rejection are presented above.


***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexa D. Neckel whose telephone number is 571-272-1446. The examiner can normally be reached on Monday - Thursday from 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Alexa D. Neckel  
Primary Examiner  
Art Unit 1764

September 18, 2006